

# Breast Cancer, Genes, and the Environment

UNC-Chapel Hill

Center for Environmental Health and Susceptibility

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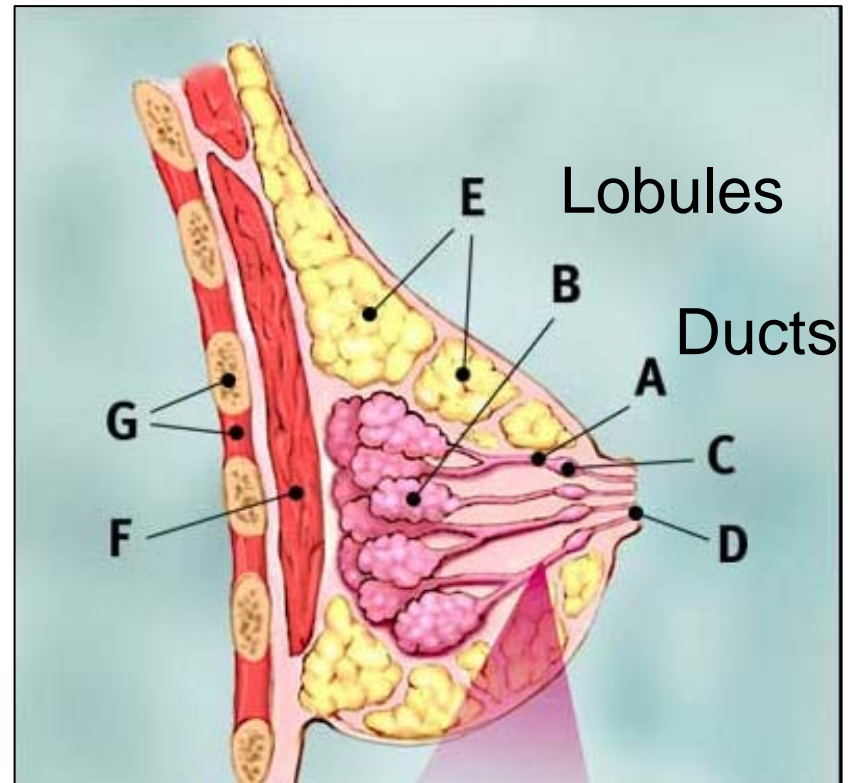


# Goals

- To learn about breast cancer risks
- To learn how individual genetics and environmental factors may contribute to increased breast cancer risk
- To identify risk reduction activities

# What Is Breast Cancer?

- Cells in the breast grow out of control and form a lump
- Lumps can either be benign or malignant
- Malignant growths are called breast cancer



# Risks for Breast Cancer



Personal



Environmental



# Personal Estrogen-Related Risks

- Early menstruation

*Before 12yrs old -- increased risk*

- Oral contraceptives

*Increased risk dissipates since time of last use*

- Child bearing

*First child born after age 30 -- increased risk*

*No children -- increased risk*



# Personal Estrogen-Related Risks

- Breastfeeding

*12+months -- decreased risk*

- Late menopause

*After 55yrs old -- increased risk*

- Long-term hormone replacement therapy

*More than 5yrs -- increased risk*



# Other Personal Risks

- Being age 55 or older
- Having breast cancer previously
- Family history of breast cancer
- Some types of breast disease
- Dense breast tissue



# Family History

- Shared genetic makeup
- Shared lifestyle
- Similar environmental exposure





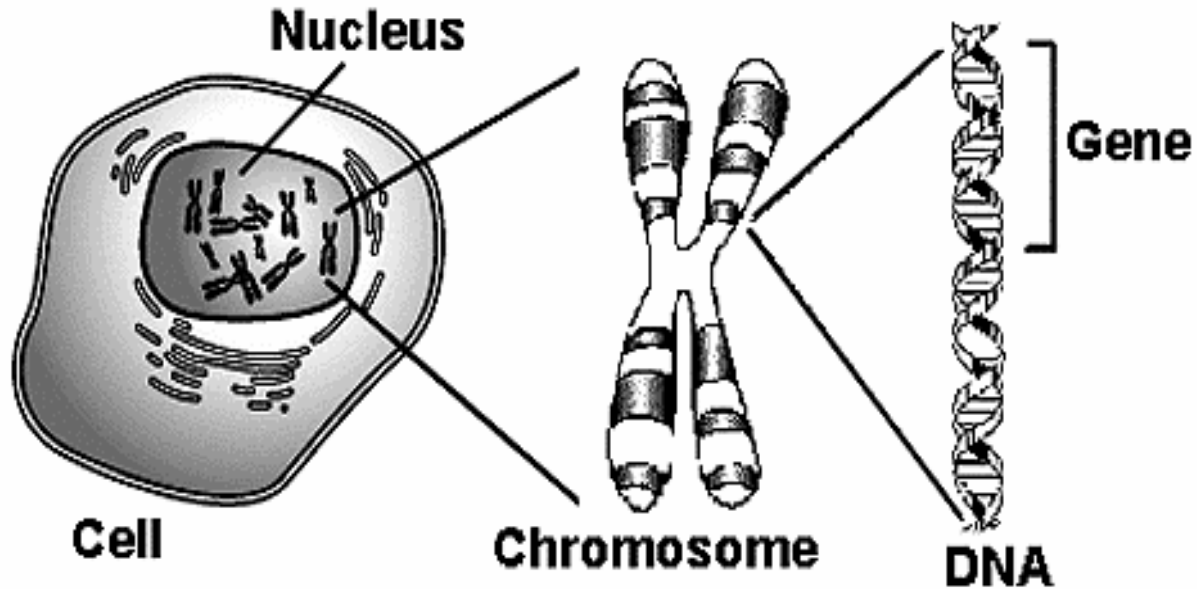


# A Quick Science Lesson

**Genes:** Present in all cells and help provide instructions for how to build and maintain a human.



# A Quick Science Lesson





# A Quick Science Lesson

**Environment:** Everything around you.

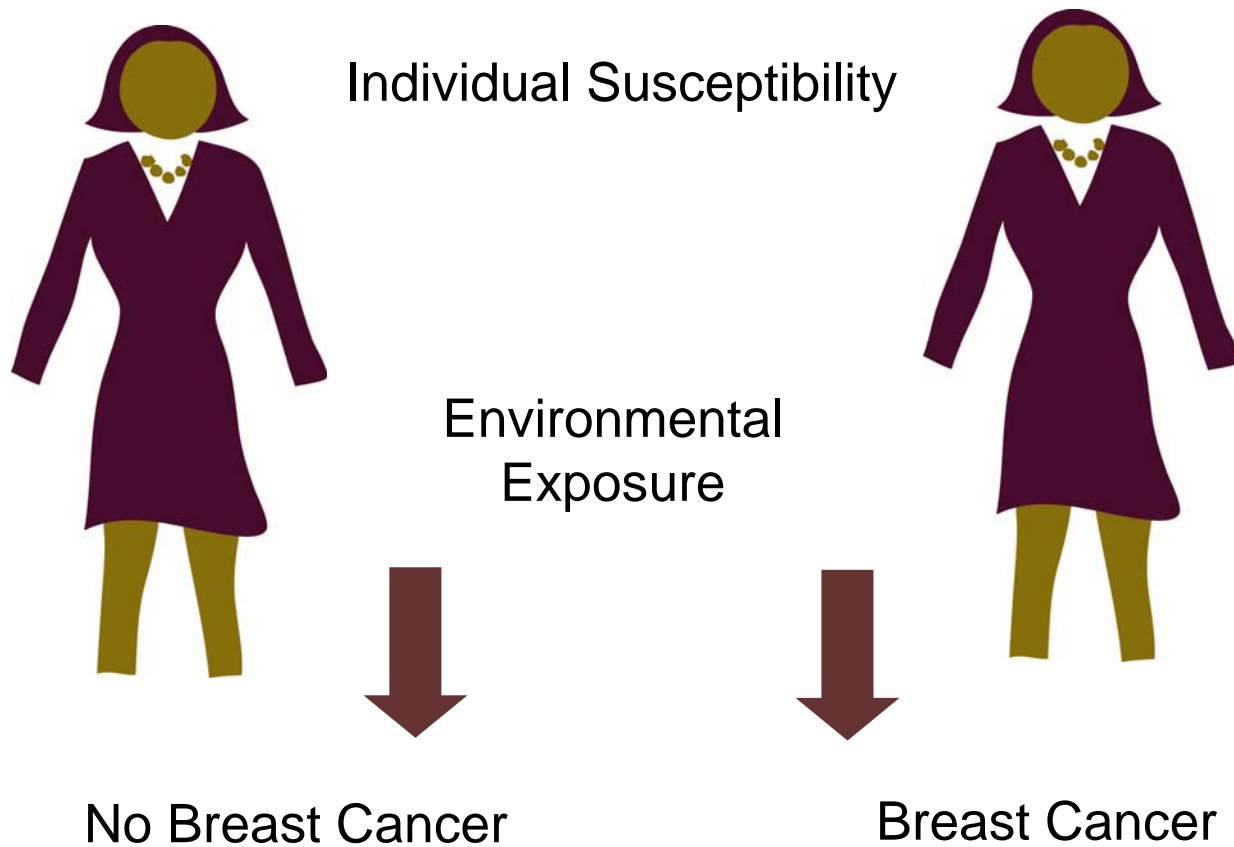
(air, water, diet, home, workplace, etc.)

# Hereditary Genetic Risks

- 5-10% of breast cancer is caused by inherited genetic mutations.
- 2-5% caused by inherited mutations in BRCA 1 and BRCA 2 genes.



# Gene-Environment Interaction



# Environmental Risk Factors and Preventive Steps

- Alcohol

*One or more drinks/day -- increased risk*



- Diet

*High in fruits and vegetables -- decreased risk*



- Exercise

*Regular exercise -- decreased risk*



- Weight

*Maintaining healthy weight -- decreased risk*

# Environmental Risk

- Toxins can damage breast DNA. Over time damaged DNA can lead to cancer.
- Exposure to high doses of radiation, such as for treating Hodgkin's disease, in women under 30 shows increased risk for breast cancer.



# Environmental Risk

- Organochlorines such as DDT and PCBs

*No association with increased breast cancer risk*

- Electromagnetic fields

*No association with increased breast cancer risk*





# Environmental Risk

- Polycyclic aromatic hydrocarbons (PAHs)

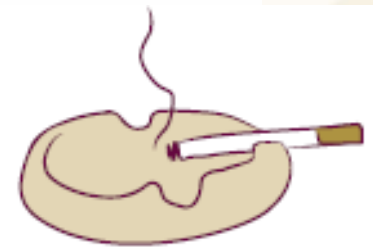
*Produced when coal, oil, gas, garbage, or other organic substances are burned*

*Can damage DNA*

- Smoking

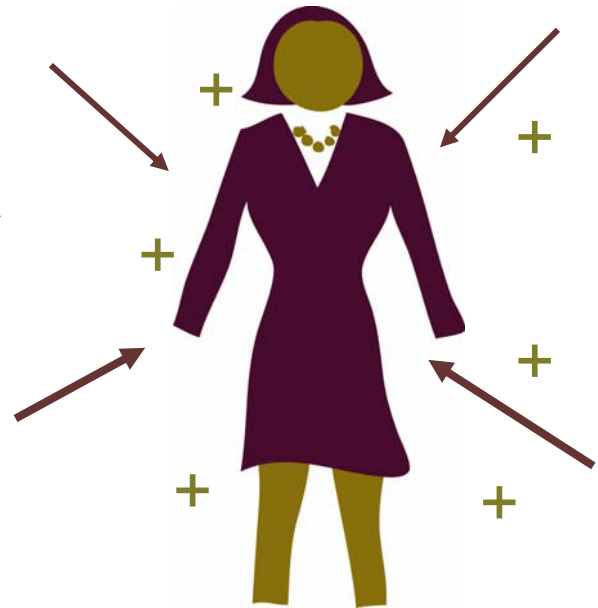
*Passive smoking – long-term smoking spouse*

*Smoking – teenager*



# Screening for Breast Cancer

- Breast self-exam
- Clinical breast exam
- Annual mammogram after age 40
- Early diagnosis increases chance of survival



# Questions?

Kathleen Gray, Acting Director  
UNC CEHS Community Outreach and Education Program  
(919) 966-9799  
kgray@unc.edu

Diana Degen, Research Associate  
UNC CEHS Community Outreach and Education Program  
(919) 966-2463  
degen@email.unc.edu

